

# Naval Health Research Center Quarterly Update

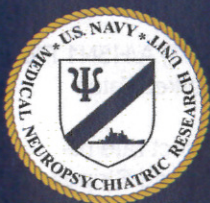
3rd Quarter

Spring 2009

## Mental Health Promotion Video "ECHOES" Debuts



## Readiness Through Research and Development



1959

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Naval Health Research Center

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**Capt Kerry Thompson**  
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# Command Corner

You never read in the headlines “NHRC: at the tip of the spear of the H1N1 outbreak in the U.S.” but did you know our Respiratory Diseases Research Department found the first two cases of Swine-origin Influenza Virus H1N1 (SOIV) in America? As a network laboratory for the Global Emerging Infectious Surveillance Program (GEIS), NHRC collects throat and nasal samples of patients with Febrile Respiratory Illness (FRI) from 8 DoD recruit centers, dependents at NMCS and ships in the 2nd, 3rd, and 7th Fleet representing collection sites from around the globe as these ships deploy. In addition, in collaboration with county officials, the CDC, the Mexican government and the US State Department they test samples from clinics on the US/Mexico border. The trends of influenza like illness (ILI) are then shared with the Centers for Disease Control to create a global picture of the types in ILI showing up in the world which ultimately assists in determining the type of flu shot we receive each winter.

While much of what you heard in the media about SOIV came from the local health officials and the CDC, it was the expertise and attention to detail by the men and women of the Respiratory Diseases Research Department who were at the

forefront of the epidemic. The first case found in the US was in San Diego County and came from a sample collected from a DoD dependent sampled in San Diego at a local DoD clinic. The second was collected from a subject being treated in one of the border clinics we support with surveillance activities in Imperial County. Subsequent to finding the first two cases in the US, NHRC became the first DoD laboratory to be certified by the CDC to be a confirmation testing site for H1N1 due to skills of our outstanding staff. The Department is also working with industry partners on clinical trials to provide improved therapies for influenza. NHRC researchers played a key role in providing timely information to Naval leadership on the spread of the virus among Navy and Marine Corps commands to allow them to most adequately manage the exposure to others.

Take a minute to thank the team for their tireless efforts during this outbreak and recognize them all for a Job Well Done! Their dedication and loyalty is second to none. ❖

- K. Thompson

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## NHRC in the News

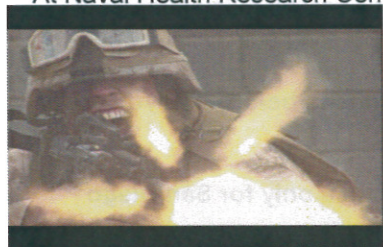
- US Navy: Navy Updates Number of Confirmed H1N1 Cases From the Department of the Navy—1 Jun 2009, TMC News
- Pigs acted as ideal crucibles for new hybrid flu virus—31 May 2009, BusinessMirror
- Navy confirms 47 'swine flu' cases—15 May 2009, Navy Times
- Swine flu first seen in San Diego boy—3 May 2009, MarketWatch
- Tracking the swine flu virus—3 May 2009, Los Angeles Times
- U.S. military had first intel on swine flu outbreak—3 May 2009, Redding.com
- Find isolates swine flu virus—29 Apr 2009, TheStar.com/Canada
- Arbor Vita Receives FDA Clearance of Its AVantage(TM) A/H5N1 Flu Diagnostic—7 Apr 2009, MarketWatch
- Study on Naples' birth defect rate released—28 Feb 2009, Stars and Stripes
- Your Health Matters—5 Feb 2009, Union Sentinel ❖

# “Echoes” - Past trauma to present life



The wars in Iraq and Afghanistan have triggered intense concern about psychological health problems in returning combat veterans. In response, the

military services have hired hundreds of additional mental health providers, along with implementing combat and operational stress control (COSC) programs, to educate service members about the signs of combat stress and the resources available for stress management. Nevertheless, profound cultural barriers to seeking mental health care remain, due to the stigma associated with mental health issues. Specifically, surveys of military personnel consistently show high levels of embarrassment surrounding mental health. Many military personnel view combat-related anxiety or mood disorders as a sign of personal weakness, and believe their peers and leaders would lose confidence in them if they were to seek assistance for stress-related problems. As a consequence of this embarrassment and stigma, service members in need of mental health services may deliberately avoid getting the support they need.



At Naval Health Research Center, the Behavioral Science and Epidemiology Department has a long history of developing interventions to change attitudes and health-related behavior. Within the Department, Dr. Jerry Larson and Dr. Heidi

Kraft began developing the story-line for a brief public education video designed to reduce stigma by portraying a Marine combat veteran and his struggles with combat stress. They felt that it was important to show the way in which untreated symptoms of combat stress can interfere with family life, believing those service members would be willing to seek help for their families' sake, even if they were otherwise inclined to avoid care for themselves. Moreover, Dr. Larson and Dr. Kraft wanted to embed the message, consistent with Marine Corps doctrine, that combat stress can be viewed as an injury analogous to physical wounds sustained on the battlefield. They also chose an amusement park as the setting in which the video should be filmed, knowing that it provided a cacophony of sights and sounds that could be disturbing to a combat veteran traumatized by war.

Resources to develop this video became available through California Congresswoman Susan Davis' support of supplemental funding for stress mitigation strategies. To produce the video NHRC and Science Applications International Corporation (SAIC) partnered with Strategic

Operations/Stu Segall Productions, an organization who uniquely combines high quality film production with realistic Iraqi villages used for Marine Corps training. By leveraging use of the existing sets and the established relationship between the studio and the Marines it was feasible to produce realistic and credible combat reenactments at a relatively low cost.

The final video is entitled “Echoes” to signify the spillage of past trauma into present life. The protagonist is a Marine Corps combat veteran, who is agitated by abrupt noises and violent scenes at a carnival and video arcade, and for whom a roller coaster ride with his wife and daughter triggers a painful memory of a bloody engagement in Iraq. The Marine is clearly suffering from survivor's guilt related to the death of one of his squad members.



After leaving the carnival, the wife expresses her concern about her husband's obvious distress and his continued denial that anything is wrong. Talking honestly together about his state of mind, perhaps for the first time, they conclude that it is time for him to seek help for his symptoms.

At the conclusion of the film, an on-camera statement is delivered by U.S. Marine Sgt James “Eddie” Wright, a decorated OIF veteran and multiple amputee. Sgt Wright's message reinforces the view that stress related injuries are not a sign of weakness, and that they are treatable.

Since Echoes was first completed and circulated in April, Navy leadership has enthusiastically embraced the video as an important and timely message. The Vice Chief of Naval Operations has directed Echoes be widely distributed. The video is now viewable at many Navy websites, including the Navy's Lifelines website, (<http://www.lifelines.navy.mil/lifelines/videotraining/index.htm>).

Echoes is shown at Returning Warrior Weekends for redeployed expeditionary Sailors, and BUMED has asked NHRC to develop additional combat stress videos. Moreover, the Behavioral Science and Epidemiology Department will soon begin a project to develop broad stigma reduction programs for both Army and Marine Corps. While Echoes represents just one of many stress-related initiatives at Naval Health Research Center, command efforts continue to focus on Improving the health, quality of life, and readiness of all service members. ❖





## H1N1 Flu Outbreak

NHRC has received little attention for its critical role in uncovering the U.S. outbreak with what's known as an H1N1 influenza A virus, so *ScienceInsider* asked for a detailed explanation of its influenza program and how these two cases came its way.

### Q: When did NHRC increase its surveillance capabilities for influenza?

The Department of Respiratory Diseases Research at NHRC serves as the Navy hub for respiratory disease surveillance for the Department of Defense Global Emerging Infectious Disease Surveillance and Response System (GEIS). The Department's forty-four surveillance activities cover recruit training among all military services, three fleets, overseas settings and populations located on the border with Mexico. Although active since 1997, the Department expanded surveillance in 2004 largely as a result of a need to intensify pandemic surveillance due to the avian influenza (H5N1) crisis. NHRC augmented existing febrile respiratory illness surveillance programs in military recruit trainees and ship-board populations and expanded into dependent populations in San Diego. Also, in a collaborative effort with CDC, a surveillance was developed on the Southern California-Mexico border, which was enhanced this year to deepen surveillance and augment diagnostic training of our Mexican collaborators via funding from the Department of State's Biosecurity Engagement Program. NHRC analyzes samples from almost 6,000 individuals each year. Given these activities were in place, NHRC was prepared when the swine influenza epidemic arose in March of 2009.

### Q: How did these swine flu cases end up at NHRC?

The first case, a 10-year-old DOD dependent, was identified in a trial to evaluate a novel influenza diagnostic. On 1 April, a swab sample from the patient was tested on the diagnostic platform. The result suggested an influenza A but subtype negative virus. Our screening questionnaire deemed the patient at low-risk for an avian influenza infection. Per the study protocol, a second specimen was sent to a third-party lab in Wisconsin. This laboratory, along with the State laboratory, confirmed the influenza A/un-typed finding. The specimen and an isolated virus were then sent to CDC for confirmation. The CDC determined the virus was an influenza A/swine/H1N1.

The second case, a 9-year-old female from Brawley, California, was sampled in the collaborative study with the CDC's Border Infectious Disease Surveillance Project. What was thought to be a routine specimen was sent to our laboratory the first week in April. Our initial testing demonstrated an influenza A/untyped virus. Further testing on the Ibis T5000 platform, which infers H and N types from multiple genomic signatures, suggested an influenza

A/swine/H1 virus. [Although most tests rely on known DNA sequence or antibodies to identify influenza isolates, the Ibis T5000 has a mass spectrometer and can identify unknown subtypes.] This was right about the time we received word from CDC about the first case. At that point we knew we were onto something significant. The CDC subsequently confirmed an influenza A/swine/H1N1 virus. Since 20 April, NHRC has subsequently analyzed specimens from 2,426 individuals and identified Swine-origin Influenza Virus H1N1 (SOIV) infection in over 350.

### Q: What was the reaction of the researchers at NHRC?

The evasive nature of influenza viruses keeps us on our toes. Because of the obvious public health concern, we found it prudent to send the sample to CDC for confirmation.

### Q: How many influenza specimens does NHRC process during flu season and has it increased since the discovery of this swine flu case?

NHRC regularly processes around 5,500 specimens a year, about two-thirds of which come in during the influenza season from October to February. Normally, towards the end of the flu season, the number of specimens we process each week falls. In the 2008-2009 season, cases began to decrease in late January. This decline continued until last week when the number of

cases and the sampling effort among our civilian populations was increased.

### Q: Had you ever had specimens before that you could not type and sent to CDC?

This was the first.

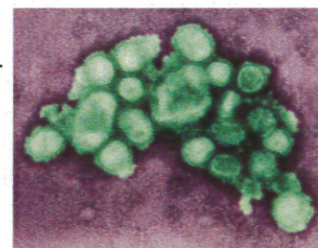
### Q: Does NHRC do surveillance only for San Diego County or for a larger area?

Our surveillance is quite expansive. NHRC is the Navy hub for the conduct of population-based surveillance at recruit centers involving the Army, Navy, Air Force, Marine Corps and Coast Guard. We also conduct surveillance onboard 20 large-deck U.S. Navy ships in three fleets, within the Pacific Rim, among deployed populations and of course along the U.S./Mexico border. We participate in surveillance during military exercises such as Cobra Gold, in Thailand, and also collaborate in febrile respiratory infection surveillance with the Singaporean military.

### Q: Do you now have the capability to identify this strain of swine flu or must samples still be sent to the CDC?

NHRC has been confirmed cases of SOIV using an assay developed by the CDC since 7 May. We also have developed our own diagnostic tests and have the means to isolate and characterize SOIV safely within our laboratories. ❖

*blogs.sciencemag.org/scienceinsider*



## Recent Publications & Presentations

Booth-Kewley S, Larson GE, Alderton DL, Farmer WL, Highfill-McRoy R. Risk Factors for Misconduct in a Navy Sample. *Military Psychology*, v21(2) April 2009, p252-69.

Buono M, Leichter S, Heaney J. Peripheral sweat gland function is improved with humid heat acclimation. *Journal of Thermal Biology*, 2009 Apr; 34 (3): 127-130.

Houng HS, Lott L, Gong H, Kuschner RA, Lynch JA, Metzgar D. Adenovirus Microsatellite Reveals Dynamics of Transmission During a Recent HAdV-14 Epidemic. *Journal of Clinical Microbiology*, 2009 Apr 29. [Epub ahead of print]

LeardMann CA, Smith TC, Smith B, Wells TS, Ryan MAK. Baseline self reported functional health and vulnerability to post-traumatic stress disorder after combat deployment: prospective US military cohort study. *BMJ* 2009 Apr 16; 338:b1273.

MacGregor AJ, Shaffer RA, Dougherty AL, Galarneau MR, Raman R, Baker DG, Lindsay SP, Golomb BA, Corson KS. Psychological correlates of battle and nonbattle injury among Operation Iraqi Freedom veterans. *Military Medicine*. 2009 Mar;174(3):224-31.

McWhorter SK, Stander VA, Merrill LL, Thomsen CJ, Milner JS. Reports of Rape Reperpetration by Newly Enlisted Male Navy Personnel. *Violence & Victims* 24 (2) 2009; 204-18 (15)

Phillips CJ, Matyas GR, Hansen CJ, Alving CR, Smith TC, Ryan MA. Antibodies to squalene in US Navy Persian Gulf War veterans with chronic multisymptom illness. *Vaccine* June 2009; 27: 3921-3926

Roesch SC, Aldridge AA, Vickers Jr RR, Hervig LK. Testing personality-coping diatheses for negative and positive affect: a longitudinal evaluation. *Anxiety, Stress & Coping*, v22 (3) May 2009, p263-81.

Tate JE, Bunning ML, Lott L, Lu X, Su J, Metzgar D, Brosch L, Panozzo CA, Marconi VC, Faix DJ, Prill M, Johnson B, Erdman DD, Fonseca V, Anderson LJ, Widdowson MA. Outbreak of Severe Respiratory Disease Associated with Emergent Human Adenovirus Serotype 14 at a US Air Force Training Facility in 2007. *Journal of Infectious Diseases* 2009;199:1419-1426. ❖

## Poor Health Predicts PTSD

A recent article published in *BMJ* by Cynthia LeardMann et al., from NHRC's Deployment Health Research Department has received media attention. *BMJ*. 2009 Apr 16;338:b1273.

The focus of the article is "to determine if baseline functional health status, predicts new onset symptoms or diagnosis of PTSD among deployed US military personnel with combat exposure." The authors used data collected from the Millennium Cohort Study. "The Millennium Cohort Study began collecting baseline data in July 2001, before the start of the current wars in Afghanistan and Iraq, and obtained follow-up data from June 2004 to February 2006."

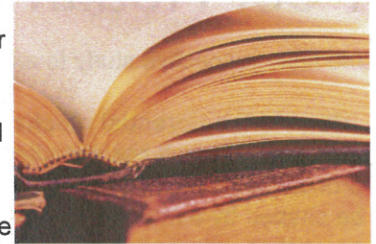
Recent Q&A between reporters and authors is below.

**Why was this study done?** A previous study using data from the same large military sample showed those with combat exposure are at increased risk of PTSD. The aim of this study was to examine if baseline physical and mental

health predicts PTSD among this high risk group of deployers who had reported combat exposures.

**What were the most important relationships (i.e. education, smoking, drinking, etc)?** In this study, the strongest predictor of PTSD was baseline mental health, but other factors significantly associated with PTSD included poor physical health, female gender, non-officer (enlisted) status, service in the Army, current smoking status, combat severity, and those of other races/ethnicities.

**Is this the first study to show this association?** While other studies have examined the association between pre-trauma factors and post-trauma mental health status, most of these studies have been of retrospective or cross-sectional design, making it difficult to ascertain the effects of decreased mental or physical health on new onset of PTSD. To our knowledge this is



## Poor Health (Cont.)

the first prospective study to examine this relationship.

### What is the potential mechanism?

Previous research has indicated that psychological processes during the trauma or stressful experience might be shaped by a multitude of integrated factors, including perception, interpretation, and evaluation of the traumatic event, as well as coping strategies used, and other personal and social factors. Therefore, individuals with diminished mental health prior to a traumatic experience might be more likely to react poorly to the stressful event, including having a negative response and dissociative experience. Furthermore, having diminished mental health prior to the event may not only affect the reaction while the trauma is occurring but possibly the

coping strategies used after the event.

### What are the potential clinical implications?

Since it is possible to screen for decreased mental or physical health status using a self-reported instrument, it may be helpful to provide additional or enhanced training for these personnel to better prepare them to handle the stress related to combat deployment. In theory, an early intervention program could be available to this vulnerable population after exposure to a stressful event or they could be protected from stressful exposures, when possible. ❖

## Highlights from the lab

- Medical Modeling & Simulation Department's EMED staff met with Dr. Eric Kuncir, Chief of Surgery at Naval Medical Center San Diego about research collaborations. A study will be conducted to look at a patient's outcome between military personnel and their civilian counterparts. The civilian data will be obtained from the National Trauma Databank.
- Researchers from the Warfighter Performance Department provided assistance during a recent training evolution with both the BUDs and SWCC candidates. Mr. Evan Johnson and Mr. Jay Heaney assisted medical personnel and school instructors monitor the core temperature of candidates during various "Hell Week" activities. Use of the ingestible core temperature transmitter provides the capability to safely monitor the candidates in decreasing the occurrence of hypothermic incidents.
- NHRC hosted the NATO Research & Technology Organization, Human Factors & Medicine-174 (HFM-174) Working Group, Medical Fitness for Expeditionary Mission working group for their semi-annual meeting. CDR Todd Sander is the Navy representative on this panel and hosted the meeting at NHRC. The purpose of this working group is to develop a standardized guide for NATO member nations to utilize when performing pre-deployment medical screenings for deployments. The group is working on a series of specific chronic medical diagnoses that, when exacerbated in theater, may diminish mission success or result in unsafe conditions for patients and other service members. This meeting focused on asthma, low back pain, diabetes, hearing loss, mood disorders, hypertension and headaches. The next meeting will take place in September 2009 in Brussels and will focus on traumatic brain injury, epilepsy, upper and lower extremity musculoskeletal diseases, allergies/anaphylaxis, cardiac diseases, inflammatory bowel disease, kidney stones and loss of consciousness/syncope.
- Dr. Jerry Larson of NHRC's Behavioral Science & Epidemiology Department accepted an invitation to be a member of the Science Advisory Board for the San Diego Veteran's Affairs Center of Excellence for Stress and Mental Health. Dr. Larson's appointment to this distinguished panel is a testament to his outstanding professional reputation and further strengthens the valuable relationship NHRC enjoys with the Department of Veterans Affairs.
- Leaders from USAMRMC, ARIEM, VA, Duke, Abt, UCSF, University of Indiana, Am Legion, SDSU, UCSD, and USC converged at NHRC to review the Millennium Cohort Study and give strategic guidance.
- Respiratory Diseases investigators identified an additional three cases of swine influenza in individuals enrolled in collaborative studies at the Naval Medical Center San Diego and/or civilians living on the US/Mexico border. Following identification, samples were shipped to the US CDC for additional analysis. Nation wide, nine cases have been identified in two states, all resulting in mild disease with no associated fatalities. NHRC staff continues to work with CDC, San Diego Public Health, Imperial County and California Public Health Departments and staff at NMCSD to intensify surveillance activities. ❖

# TIMELINE - History of Naval Medical Research

**1775** – The Continental Congress voted to arm two ships to intercept transports carrying munitions and stores to the British army in America. This was the original legislation out of which the Continental Navy grew and as such constitutes the birth certificate of the Navy.

**1789** – United States Navy was created by an Act of Congress. Doctors were made commissioned officers.

**1811** – Dr. William Paul Crillon Barton was commissioned by the Secretary of the Navy to submit his recommendations for “conducting hospitals and institutions for the sick.”

**1830** – The first patients were received at U.S. Naval Hospital, Norfolk, Virginia, the first hospital built from the marine hospital fund.

**1842** – Bureau of Medicine and Surgery (BUMED) was established by an Act of Congress. Dr. William P.C. Barton became the first Chief of the Bureau (later known as the Surgeon General).

**1942** – National Naval Medical Center (NNMC), Bethesda, Maryland, opens. Naval Medical Research Institute (NMRI) was commissioned as one of the commands of NNMC. The original staff consisted of 13 officers and 50 enlisted.

**1946** – Office of Naval Research (ONR) was established. Naval Submarine Medical Research Laboratory (NSMRL) was established.

**1948** – Naval Medical Research Unit No. 4 (NAMRU-4) was commissioned at Naval Training Center, Great Lakes, Illinois to develop and conduct research to provide effective prevention and control of acute respiratory diseases in military personnel.

**1951** – Field medical schools were commissioned at Camp Pendleton and Camp Lejeune.

**1953** – NAMRU-4 first isolated the influenza virus in tissue culture. A year later, they identified the first influenza type B variant.

**1959** – Naval Medical Neuropsychiatric Research Unit (NMNPRU) was established in San Diego, California to conduct research in the area of neuropsychiatry as it applied to the naval service.

**1961** – Armed Forces Radiobiology Research Institute was formed to work with the first DoD nuclear reactor for use in medical research, which was located at NNMC.

**1962** – NAMRU-3 discovered the natural infection cycle of West Nile fever, which involves mosquitoes and birds as primary vectors and hosts.

**1964** – Naval Submarine Medical Center was established

at Naval Submarine Center, Groton, Connecticut.

Naval Medical Research Laboratory was disestablished.

**1967** – Naval Dental Research Center was established at Naval Training Station Great Lakes, Illinois.

**1968** – NSMRL developed the nationally recognized three-agent stannous fluoride anticaries technique, which became the basis of the preventive dentistry program of the U.S. Navy and many other public health dental efforts.

**1969** – NMNPRU became a command-level organization.

**1970** – NAMI's research and development functions were separated and placed under Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, Florida.

**1971** – Naval Aerospace Medical Research Laboratory Detachment was established at NASA Michoud Assembly Facility for the development of biomedical data related to impact injury.

**1974** – NMNPRU became Naval Health Research Center (NHRC).

**1998** – Naval Medical Research Center (NMRC) was commissioned as an Echelon 3 headquarters with the mission to provide leadership for NIDBR, NAMRU-2, NAMRU-3, and NMRCD.

NHRC was commissioned as an Echelon 3 headquarters with the mission to provide leadership for NAMRL, NSMRL, EHEL, and DEBL.

**1999** – NMRC, along with the Walter Reed Army Institute of Research, moved to the new federal research laboratory facility, the Inouye Building, erected in the Forest Glen section of Silver Spring, Maryland.

**2006** – NMRC was re-organized to an Echelon 4 Command and gained new subordinate laboratories as a part of the re-organization. The new subordinates labs are: NHRC (Echelon 5), NAMRL, NSMRL, EHEL, and DEBL.

**2009** – NHRC's Respiratory Disease Research Laboratory detected the first US cases of the April 2009 influenza A/ H1N1 virus, which resulted in significant local, national and international attention.

NAMRU San Antonio was established. ❖

*Revision of History of the Research Div., BUMED, U.S. DoN by CAPT (Ret) Charles Schilling*

[www.med.navy.mil/sites/nmrc/Pages/history.htm](http://www.med.navy.mil/sites/nmrc/Pages/history.htm)